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Characteristics of patients who return to the emergency department after an observation-unit assessment

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Objective Emergency department observation units (EDOUs) transition patients from the ED to dedicated areas where they can receive continuous monitoring. Understanding patient return visits after EDOU discharge is important for optimizing healthcare. The objective of this study was to investigate the correlations between demographic and clinical features and the likelihood of returning to the ED within 30 days following an initial EDOU assessment.

Methods This retrospective, observational, cohort study of adult EDOU subjects was conducted between February 1, 2018, and January 31, 2023. Adult patients who were evaluated in an EDOU and returned to an ED within 30 days were compared with those who were assessed in the EDOU but did not return to the ED within 30 days. The analysis took into account multiple visits by the same subject and made adjustments for variables of sex, ethnicity, insurance status, primary diagnosis, and disposition using a generalized linear mixed model.

Results A total of 14,910 EDOU encounters was analyzed, and 2,252 patients (15%) returned to the ED within 30 days. The analysis took into account several variables that indicated a significant association with the likelihood of returning to the ED within 30 days. These were sex (P<0.001), ethnicity (P=0.005), race (P<0.001), insurance status (P<0.001), primary diagnosis (P<0.001), and disposition (P<0.001). Emergency severity index and length of stay were not associated with ED return.

Conclusion Understanding these factors may guide interventions, enhance EDOU care, and reduce resource strain. Further research should explore these associations and the long-term intervention impacts on improved outcomes.

Keywords Emergency departments; Clinical observation units; Recidivism

Capsule Summary

What is already known

Emergency department observation units (EDOUs) play a role in transitioning patients from an ED to a dedicated area where they can receive continuous monitoring. Understanding return visits by patients after EDOU discharge is important for optimizing healthcare.

What is new in the current study

This study describes the relationships between specific demographic and clinical features and the likelihood of returning to the ED within 30 days following an initial assessment in the EDOU.

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INTRODUCTION

Emergency department observation units (EDOUs) play a role in transitioning patients from the ED to a dedicated area where they can receive continuous monitoring. These specialized units are responsible for assessing whether it is safe to discharge patients or if they require continued care. Over time, more hospitals have equipped themselves with EDOUs to serve patients with a range of conditions beyond the initial focus on chest pain, asthma exacerbation, and exacerbation of congestive heart failure. Despite this growth and diversification in patient populations, EDOUs typically remain committed to their core objective of applying nationally recognized guidelines, informed by best practices and collective experience, to assess, manage, discharge, or admit patients within 24 hours. Several studies of EDOU care have demonstrated that such units can improve healthcare outcomes for adult and pediatric patients. Their advantages include reduced healthcare costs, shorter hospital stays, more efficient utilization of hospital resources, enhanced patient satisfaction, and improved diagnostic accuracy.

One standard metric used to evaluate the performance of both EDs and EDOUs is the hospital return visit rate, or recidivism. The reasons why patients return to an ED are multifactorial and encompass issues related to their initial visit and unrelated complaints. Although patients admitted to an EDOU typically have a lower likelihood of presenting with a high-risk condition such as acute coronary syndrome, the patient and the healthcare system must address any inefficiencies in discharging patients with risk factors that could contribute to a return visit.

Previous studies have examined the aspects related to patient returns to EDs within 72 hours and predictive factors for unplanned hospital admissions within the same period after ED discharge. Khera et al. [1] reported an overall decrease in hospital readmissions within 72 hours of discharge. However, they also reported an increase in observation stays and ED visits within 30 days postdischarge. Other studies have focused on patients in the EDOU who make return visits. One prospective observational cohort study that took place in 2002 and identified patient characteristics associated with recidivism in EDOU patients found that the highest rates of recidivism were associated with treatment protocols tailored to painful conditions [2].

Understanding patient return visits after EDOU discharge is important for optimizing healthcare. By identifying these factors, targeted interventions can be developed to enhance EDOU patient care. These insights can help ensure efficient use of both EDs and EDOUs. The primary objective of this study was to investigate the correlations between specific demographic and clinical features and the likelihood of returning to an ED within 30 days following an initial EDOU assessment.

METHODS

Ethics statement

The study was granted an exemption by the Northwell Health Institutional Review Board (No. 22-0468).

Study design and setting

This retrospective, cohort study of EDOU subjects was conducted at the Staten Island University Hospital (SIUH) North Campus (Staten Island, NY, USA), a 500-bed academic tertiary care center with 97,000 ED visits annually. The study was conducted between February 1, 2018, and January 31, 2023. Charts for January 1 through December 31, 2020, were excluded due to variations in practices during the COVID-19 pandemic. The EDOU is a closed unit with eight beds. When the beds are filled, patients can be held in the ED as EDOU patients. The EDOU has approximately 2,200 visits each year.

Emergency department observation unit

The SIUH EDOU opened on August 1, 2012, as a closed unit operated by the ED. Staffing includes 24 hours of mid-level coverage and board-certified emergency medicine coverage by attending physicians. Dedicated EDOU nursing staff provide patient care. Ancillary support is based on leadership assessment of unit activity. A decision to place a patient in the EDOU rests with the ED attending physician caring for the patient. Any patient with a specific medical condition requiring focused evaluation and management with a high probability of discharge in less than 24 hours may be considered for the EDOU. Specific patients are treated and cared for based on EDOU clinical guidelines. These institutional guidelines are based on best practices and experiences in other observation units nationwide. Currently, clinical guidelines exist for patients after bariatric surgery and percutaneous coronary intervention; those with chest pain, syncope, or suspected transient ischemic attacks; those requiring observation after a toxicologic exposure or overdose; and patients requiring a transfusion of blood or blood products. Patients with severe illness (e.g., hemodynamic instability) or multiple acute clinical conditions are excluded from admission to the EDOU.

Selection of participants

All adult patients admitted to the ED and subsequently placed in

an EDOU at SIUH during the study period were eligible for inclusion. Subjects evaluated in the EDOU and returned to the ED within 30 days were identified and compared with those assessed in the EDOU but who did not return to the ED within 30 days. Subjects were identified through an Allscripts Sunrise EHR (Allscripts). Charts with incomplete data were excluded from this study. If subjects were reevaluated in the EDOU after 30 days, they were permitted to be included again in the study.

Data collection and processing

Data collection included demographic and clinical characteristics of age, sex, race, ethnicity, insurance type, number of ED visits, triage level, chief complaint, primary diagnosis, select diagnostic interventions, disposition type, Emergency Severity Index (ESI), and length of stay (LOS). Our study used ESI scores to gauge the urgency and severity of patients' conditions upon arrival at the ED. The ESI is a five-level triage tool that categorizes ED patients based on the severity of illnesses or injuries and the amount of resources their care is anticipated to require. Scores range from 1 (requiring immediate life-saving intervention) to 5 (requiring the least urgent care) [3]. The data were downloaded into a Microsoft Excel file (Microsoft Corp) that was stored securely within our organization's network to ensure data security and privacy.

Unless specified otherwise, categorical variables were summarized as frequency (percentage) and continuous variables as median (interquartile range). Our primary outcome was a return to the ED within 30 days of discharge from an EDOU. We investigated predictors associated with return to the ED using a generalized linear mixed model to account for multiple visits from the same subject. A two-sided P-value of <0.05 was considered statistically significant. Data were analyzed using SAS ver. 9.4 (SAS Institute Inc).

RESULTS

Demographic and clinical characteristics

A total of 14,996 EDOU patient encounters was recorded during the study period. After excluding 86 encounters due to missing information, 13,048 patients remained, representing 14,910 EDOU visits. Of these, 11,760 (90.1%) involved a single visit, and 12,941 (99.2%) involved three or fewer visits. Within this cohort, 2,252 patients (15.1%) returned to the ED within 30 days.

Clinical variables

Tables 1–3 provide detailed clinical and demographic characteristics. Age (P=0.704), ESI (P=0.987), and LOS in the EDOU (<8, 8–16, >16 hours; P=0.634) were not significantly associated with the primary outcome (Table 3). Several variables were significantly associated with the likelihood of returning to the ED within 30 days. These were sex (P<0.001), ethnicity (P=0.005), race (P<0.001), insurance status (P<0.001), primary diagnosis

Table 1. Demographics and characteristics between patients who returned and did not return to the ED

Characteristic	Total (n=14,910)	Return to ED		P-value
		No (n=12,658)	Yes (n=2,252)	
Age (yr)				<0.001
18–39	1,582 (10.6)	1,344 (10.6)	238 (10.6)	
40–64	7,879 (52.8)	6,897 (54.5)	982 (43.6)	
≥65	5,449 (36.5)	4,417 (34.9)	1,032 (45.8)	
Sex				0.007
Male	8,222 (55.1)	7,039 (55.6)	1,183 (52.5)	
Female	6,688 (44.9)	5,619 (44.4)	1,069 (47.5)	
Ethnicity				<0.001
Hispanic or Latino	2,296 (15.4)	1948 (15.4)	348 (15.5)	
Not Hispanic or Latino	12,258 (82.2)	10,379 (82.0)	1,879 (83.4)	
Not specified	356 (2.4)	331 (2.6)	25 (1.1)	
Race				<0.001
White	9,634 (64.6)	8,100 (64.0)	1,534 (68.1)	
African American/Black	1951 (13.1)	1,623 (12.8)	328 (14.6)	
Asian	609 (4.1)	552 (4.4)	57 (2.5)	
Not specified	62 (0.4)	52 (0.4)	10 (0.4)	
Other	2,654 (17.8)	2,331 (18.4)	323 (14.3)	
Insurance status				<0.001
Medicaid	3,010 (20.2)	2,512 (19.8)	498 (22.1)	
Medicare	5,201 (34.9)	4,129 (32.6)	1,072 (47.6)	
Private	6,462 (43.3)	5,839 (46.1)	623 (27.7)	
Self-pay	211 (1.4)	155 (1.2)	56 (2.5)	
Veterans Affairs	26 (0.2)	23 (0.2)	3 (0.1)	

Values are presented as number (%). Percentages may not total 100 due to rounding.
ED, emergency department.

Table 2. Clinical characteristics between patients who returned and did not return to the ED

Characteristic	Total (n = 14,910)	Return to ED		P-value
		No (n = 12,658)	Yes (n = 2,252)	
Emergency Severity Index				0.019
1	10 (0.1)	9 (0.1)	1 (0)	
2	1,466 (9.8)	1,233 (9.7)	233 (10.3)	
3	13,029 (87.4)	11,093 (87.6)	1936 (86.0)	
4	397 (2.7)	315 (2.5)	82 (3.6)	
5	8 (0.1)	8 (0.1)	0 (0)	
Primary diagnosis				< 0.001
Anemia	940 (6.3)	547 (4.3)	393 (17.5)	
Chest pain	8,109 (54.4)	7,217 (57.0)	892 (39.6)	
Dyspnea, CHF, COPD	462 (3.1)	344 (2.7)	118 (5.2)	
Missing primary diagnosis	638 (4.3)	543 (4.3)	95 (4.2)	
Other	1,786 (12.0)	1,349 (10.7)	437 (19.4)	
Stroke, stroke-like symptoms	1,689 (11.3)	1,529 (12.1)	160 (7.1)	
Syncope	1,286 (8.6)	1,129 (8.9)	157 (7.0)	
EDOU LOS (hr)				< 0.001
< 8	2,133 (14.3)	1,682 (13.3)	451 (20.0)	
8–16	4,856 (32.6)	4,093 (32.3)	763 (33.9)	
> 16	7,921 (53.1)	6,883 (54.4)	1,038 (46.1)	
Disposition (observation)				< 0.001
AMA or eloped	649 (4.4)	509 (4.0)	140 (6.2)	
Admit	2,397 (16.1)	1980 (15.6)	417 (18.5)	
Discharge	11,795 (79.1)	10,114 (79.9)	1,681 (74.6)	
Other	69 (0.5)	55 (0.4)	14 (0.6)	
Test type				
Stress test	3,633 (24.4)	3,257 (25.7)	376 (16.7)	< 0.001
Urinalysis	2,524 (16.9)	2,087 (16.5)	437 (19.4)	< 0.001
X-ray	12,599 (84.5)	10,880 (86.0)	1,719 (76.3)	< 0.001
Ultrasound	438 (2.9)	357 (2.8)	81 (3.6)	0.044
Vascular studies	730 (4.9)	600 (4.7)	130 (5.8)	0.036
CT	7,059 (47.3)	6,236 (49.3)	823 (36.5)	< 0.001
CCTA	2,176 (14.6)	2001 (15.8)	175 (7.8)	< 0.001
MRI	1,671 (11.2)	1,536 (12.1)	135 (6.0)	< 0.001

Values are presented as number (%). Percentages may not total 100 due to rounding

ED, emergency department; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; EDOU, emergency department observation unit; LOS, length of stay; AMA, against medical advice; CT, computed tomography; CCTA, coronary computed tomography angiography; MRI, magnetic resonance imaging.

(P < 0.001), and disposition (P < 0.001).

Men had a 22% greater likelihood of returning to the ED (odds ratio [OR], 1.22; 95% confidence interval [CI], 1.10–1.35; P < 0.001). Racial and ethnic differences in our sample also affected the likelihood of returning to the ED within 30 days. Specifically, Asian individuals (OR, 0.64; 95% CI, 0.46–0.88; P = 0.008) had lower odds of returning to the ED compared with White patients. Individuals of Hispanic or Latino ethnicity (OR, 1.44; 95% CI, 1.16–1.79; P = 0.006) were more likely to return to the ED compared with those who were not of Hispanic or Latino descent.

Private insurance (OR, 0.57; 95% CI, 0.49–0.66; P < 0.001) was associated with a decreased likelihood of returning to the ED, while those in the self-pay category (OR, 1.66; 95% CI, 1.17–2.37; P = 0.005) were associated with a higher likelihood of returning to the ED compared with those enrolled in Medicaid. Enrollees of Medicare (OR, 0.99; 95% CI, 0.83–1.18; P = 0.907) did not differ significantly from those with Medicaid regarding the primary outcome.

A primary diagnosis of anemia was associated with almost three times greater odds of returning to the ED (OR, 2.95; 95% CI, 2.38– 3.64; P < 0.001) compared with chest pain. Similarly, a primary diagnosis of dyspnea, congestive heart failure, and/or chronic obstructive pulmonary disorder (OR, 1.76; 95% CI, 1.37–2.25; P < 0.001) was associated with greater odds of returning to the ED compared with a chest pain diagnosis.

Dispositions of "observation-against medical advice (AMA) or eloped" (OR, 1.61; 95% CI, 1.30–1.99; P < 0.001) and "observation-admit" (OR, 1.18; 95% CI, 1.04–1.35; P = 0.014) were associated with 61% and 18% greater odds of returning to the ED, re-

Table 3. Generalized mixed linear model for return to the ED within 30 days

Variable	Unadjusted (%)	Generalized linear mixed model		P-value
		OR	95% CI	
Age (yr)				
18–39	19	1.00	Reference	-
40–64	15	0.94	0.79–1.12	0.459
≥ 65	12	0.97	0.79–1.20	0.802
Sex				
Female	14	1.00	Reference	-
Male	16	1.22	1.10–1.35	< 0.001
Ethnicity				
Not Hispanic or Latino	15	1.00	Reference	-
Hispanic or Latino	15	1.44	1.16–1.79	0.006
Not specified	7	0.48	0.25–0.92	0.032
Race				
White	16	1.00	Reference	-
African American/Black	17	1.12	0.96–1.31	0.153
Asian	9	0.64	0.46–0.88	0.008
Not specified	16	2.01	0.84–4.82	0.112
Other	12	0.72	0.59–0.86	0.001
Insurance status				
Medicaid	17	1.00	Reference	-
Medicare	21	0.99	0.83–1.18	0.907
Private	10	0.57	0.49–0.66	< 0.001
Self-pay	27	1.66	1.17–2.37	0.005
Veterans Affairs	12	0.57	0.14–2.29	0.428
Emergency Severity Index	-	1.00	0.87–1.15	0.987
Primary diagnosis				
Chest pain	11	1.00	Reference	-
Anemia	42	2.95	2.38–3.64	< 0.001
Dyspnea, CHF, COPD	26	1.76	1.37–2.25	< 0.001
Missing primary diagnosis	15	1.25	0.98–1.60	0.071
Other	24	1.74	1.48–2.06	< 0.001
Stroke, stroke-like symptoms	9	1.12	0.86–1.44	0.405
Syncope	12	0.94	0.77–1.15	0.566
EDOU LOS (hr)				
< 8	21	1.00	Reference	-
8–16	16	1.04	0.89–1.20	0.642
> 16	13	0.98	0.84–1.14	0.800
Disposition (observation)				
Discharge	14	1.00	Reference	-
AMA or eloped	22	1.61	1.30–1.99	< 0.001
Admit	17	1.18	1.04–1.35	0.014
Other	20	1.00	0.52–1.91	0.997
Test type				
Stress test				
No	17	1.00	Reference	-
Yes	10	0.67	0.58–0.78	< 0.001
Urinalysis				
No	15	1.00	Reference	-
Yes	17	1.14	1.00–1.30	0.054
X-ray				
No	23	1.00	Reference	-
Yes	14	0.91	0.79–1.06	0.224
Ultrasound				
No	15	1.00	Reference	-
Yes	18	1.07	0.81–1.41	0.630
Vascular studies or venous duplex				
No	15	1.00	Reference	-
Yes	18	1.20	0.97–1.49	0.090
CT				
No	18	1.00	Reference	-
Yes	12	0.77	0.68–0.86	< 0.001
CCTA				
No	16	1.00	Reference	-
Yes	8	0.54	0.45–0.66	< 0.001
MRI				
No	16	1.00	Reference	-
Yes	8	0.50	0.39–0.65	< 0.001

The Emergency Severity Index was included in the regression model as a continuous variable.

ED, emergency department; OR, odds ratio; CI, confidence interval; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; EDOU, emergency department observation unit; LOS, length of stay; AMA, against medical advice; CT, computed tomography; CCTA, coronary computed tomography angiography; MRI, magnetic resonance imaging.

spectively, compared with "observation-discharge."

Use of a stress test (OR, 0.67; 95% CI, 0.58–0.78; P < 0.001), computed tomography (CT; OR, 0.77; 95% CI, 0.68–0.86, P < 0.001), coronary CT angiography (CCTA; OR, 0.54,95% CI, 0.45–0.66, P < 0.001), or magnetic resonance imaging (MRI; OR, 0.50; 95% CI, 0.39–0.65, P < 0.001) were all associated with a reduced likelihood of returning to the ED within 30 days.

DISCUSSION

Our objective was to identify factors related to the likelihood of returning to the ED within 30 days following an initial assessment in the EDOU. The results revealed significant associations between certain demographic factors and the likelihood of returning to the ED within 30 days. In the study, male patients had a 22% greater likelihood of returning to the ED compared with female patients. This suggests that sex influences an individual's healthcare-seeking behavior and their tendency to return to the ED. Thompson et al. [4] also found that women tend to seek healthcare more frequently for both physical and mental health concerns, and multiple factors could be involved in this relationship. Possible contributing factors include societal expectations, lower awareness about health, and limited access to healthcare

services.

Differences in communication styles and psychological factors may also contribute to this pattern [4]. Alternatively, men may experience a higher prevalence of certain conditions that necessitate repeated ED visits. This issue underscores the importance of considering sex differences in healthcare utilization and management of chronic diseases. Developing targeted follow-up care strategies for male patients, particularly those with known chronic conditions, could help mitigate the frequency of return visit. This approach would not only cater to the specific health needs of men, but also potentially improve overall patient outcomes by addressing the root causes of their recurrent ED visits.

The study's findings, including the identification of a 15.1% return rate within 30 days, constitute an important step in recognizing and addressing the complex factors contributing to ED revisits. This highlights the importance of the initial EDOU assessment and the broader implications for continuity of patient care and system efficiency. While the study identified a 15.1% return rate to the ED within 30 days among patients assessed in the EDOU, it also attempted to delineate the factors associated with these returns, including demographic and clinical variables such as sex, ethnicity, race, insurance status, and primary diagnosis. This implies that not all return visits may be directly related to the quality of care, or decisions made during the initial EDOU visit.

Our results also found that racial and ethnic differences can affect the likelihood of a return visit. Specifically, individuals of Asian descent had decreased odds of returning to the ED. In contrast, Hispanic or Latino patients were more likely to return. Our findings mirror those of previous studies that also found racial and ethnic differences in ED utilization [5]. These findings emphasize the critical importance of recognizing and addressing diverse patient populations' healthcare experiences and needs when developing interventions to reduce return visits. Strategies that consider cultural sensitivities, language proficiency, and disparities in healthcare access are essential to improving healthcare outcomes and reducing the burden on the ED.

Insurance status also played a significant role in predicting the odds of a return visit. This study investigated the impact of insurance status on ED return visits within the US healthcare system, which is characterized by a mix of private and government insurance programs, including Medicaid and Medicare, each of which has distinct eligibility criteria and coverage policies. Private insurance is often obtained through employers or purchased individually, while Medicaid and Medicare serve low-income individuals, families, and older adults. The type of insurance influences access to care and healthcare utilization patterns, including ED visits. Given the variability in insurance systems globally, the findings related to insurance status and ED revisits may have different implications in countries with universal or alternative healthcare insurance. In this study, patients with private insurance were less likely to return to the ED, while those in the self-pay category were more likely to return than were Medicaid recipients. Private insurance often provides greater access to primary and specialist services, enabling more timely care [6]. In contrast, individuals in the self-pay category may face financial constraints and other barriers to regular healthcare services. This can discourage them from seeking care until their conditions worsen, necessitating more frequent return visits to the ED [7]. Notably, the lack of a significant difference between Medicare and Medicaid categories suggests that insurance type influences healthcare utilization patterns differently. Medicare, which covers older adults, may be associated with healthcare needs that are more comparable with those of Medicaid recipients. These findings emphasize the need for targeted interventions that address disparities related to insurance status. Such strategies may include improving access to primary care for underserved populations, enhancing health insurance coverage for certain groups, and promoting preventive care to reduce the need for costly ED visits. Addressing these disparities may lead to improved healthcare outcomes and better access to medical services for all patients.

The primary diagnosis at the initial EDOU visit was a strong predictor of return visits. Patients with a primary diagnosis of anemia were almost three times more likely to return to the ED compared with those with chest pain. This may be because individuals requiring intermittent transfusions to treat their anemia are often managed in the EDOU. Their return visits within 30 days may primarily be related to the need for repeated transfusions rather than being indicative of inadequate care or new medical conditions. Similarly, patients diagnosed with dyspnea, congestive heart failure, and/or chronic obstructive pulmonary disorder were more likely to return, possibly due to the recurring nature of these chronic respiratory conditions. Jemt et al. [8] found that, compared with chest pain patients, ED dyspnea patients are older, have more comorbidities, and experience worse outcomes in terms of hospitalization, morbidity, and mortality. These findings highlight the importance of the nature and chronicity of the primary diagnosis when planning follow-up care and patient education. Healthcare providers should focus on ongoing disease management and ensure patients receive appropriate education and resources to manage their conditions effectively. Such an approach could reduce the need for return visits related to these specific diagnoses. The Hospital Readmissions Reduction Program

was developed and implemented by the Centers for Medicare and Medicaid Services to curb the rate of 30-day hospital readmissions for certain common, high-impact conditions. Many studies have attempted to describe interventions to comply with readmission of such patients [9–12].

Disposition decisions made during the initial EDOU visit also played a significant role in predicting return visits. Patients who left AMA, eloped, or were admitted to the hospital had increased odds of returning to the ED compared with those discharged from the observation unit. "Observation-AMA or eloped" was used to describe a subset of patients who left before completing the recommended care, possibly leading to unaddressed health issues and return visits. The category of "admitted" patients suggests a need for further inpatient care, potentially linked to the complexity of their conditions. Healthcare providers should assess each patient's condition and healthcare needs when determining the most appropriate disposition. This decision can significantly affect patient care and prevent unnecessary return visits to the ED.

The use of specific diagnostic tests, including stress tests, CT, CCTA, or MRI, during an initial EDOU visit decreased the likelihood of returning to the hospital within 30 days. This reduction in return visits can be attributed to several factors. Because these tests provide accurate and detailed diagnoses during an initial hospital visit, treatment plans can be developed based on the diagnostic information, reducing the risk of complications and subsequent hospital visits. These tests not only diagnose, but can also rule out certain medical conditions, providing physicians with crucial information for effective decision-making. Furthermore, patients, reassured by a thorough evaluation, tend to adhere more closely to medical advice and prescribed treatments, decreasing the probability of returning to the hospital. These tests can uncover underlying health problems that would otherwise remain undetected, preventing complications and emergencies and ultimately reducing the need for hospital readmission. However, the relationship between imaging studies and ED revisits should be interpreted with caution, and advanced tests should not be conducted solely to prevent revisits. While these tests contribute to more precise diagnoses and can inform more effective treatment plans, their use should be guided strictly by clinical necessity and not as a preventive measure against ED returns.

Age, LOS in the EDOU, and ESI scores were not significantly associated with the likelihood of returning to the ED within 30 days. This suggests that patient age, duration of observation, and initial severity assessment may not be reliable predictors of the likelihood of return visits. The lack of association may appear to be counterintuitive, as older patients dealing with complex health issues may otherwise appear to be more likely to return. Similarly, a more extended EDOU stay could indicate the need for additional care, potentially leading to greater chances of a revisit. A higher ESI score, indicating a worse condition, could correlate with increased ED visits. However, the results of this study suggest that other demographic and clinical factors, such as sex, ethnicity, insurance status, primary diagnosis, and disposition decisions, play more consequential roles in determining the odds of return visits.

Our study provides valuable insights into the factors associated with patients returning to the ED within 30 days after an EDOU visit. The findings have implications for healthcare providers and policymakers aiming to minimize the number of return visits and improve patient outcomes. Tailored interventions addressing demographic disparities, insurance status, disposition decisions, and the nature of the primary diagnosis may be instrumental in mitigating the burden of frequent return visits to the ED and enhancing the overall quality of emergency healthcare delivery. Further research is warranted to explore these factors and develop targeted interventions to optimize patient care in the EDOU setting.

The metric of recidivism, while important for assessing the patterns of return to the ED, also warrants further exploration, particularly in the context of frequent returners. We identified a subset of patients who returned to the ED multiple times within 30 days following their initial EDOU assessment. These returns may not necessarily indicate a problem with the quality of care provided during the initial visit. Factors such as chronic health conditions, socioeconomic challenges, and the lack of access to outpatient care resources may also play a role in these visits. This observation highlights the importance of distinguishing between returns that could be prevented through improved care or interventions in the EDOU and those that are due to factors beyond the immediate control of emergency medicine providers. Understanding this subgroup's specific characteristics and needs can guide the development of targeted strategies aimed at reducing unnecessary visits while still ensuring that patients receive appropriate care.

We recognize that the subset of repeat-return patients may have biased the data, potentially overemphasizing certain trends or associations. The presence of patients who return to the ED multiple times within 30 days of their initial assessment in the EDOU introduces a layer of complexity to the analysis of return visits. Conducting a separate analysis that excludes these repeat returners could clarify the primary drivers of ED revisits among the broader patient population. Such an approach would allow for a more nuanced understanding of the factors influencing sin-

gle-episode returns, distinguishing them from patterns associated with recurrent healthcare utilization.

Limitations

This study, which identifies factors related to the likelihood of EDOU patients returning to the ED within 30 days, does have limitations, including its retrospective nature. Even with careful data collection, retrospective studies are inherently limited by the availability and accuracy of the records. The presence of incomplete or inaccurate data, although minimized through rigorous verification processes, can introduce biases to the analysis.

Another limitation lies in the specificity of the study population. Our research focused on patients within a single academic tertiary care center, potentially limiting the generalizability of the findings to other healthcare settings with different patient demographics, hospital resources, or protocols. Factors such as regional healthcare policies and socioeconomic status, which were not directly addressed in this study, could also influence return visit patterns.

Additionally, while we found significant associations between demographic factors (insurance status, primary diagnosis, disposition decisions) and return visits, our study did not explore the underlying reasons for these associations. Further research could provide valuable insights into the nuanced factors influencing return visits and supply a more comprehensive understanding of these findings. Although we did not control for disease factors that may be linked with demographics, this likely does not undermine our findings. The primary aim was to identify broad patterns in return visits to the EDOU within 30 days. Although a valuable aspect for future research, the impact of specific disease factors on these patterns does not substantially reduce the relevance of the study's overall conclusions about return visit trends.

Hospital observation units can be structured in various ways, from inpatient-based units within the hospital to ED-based ones, each designed for different patient needs. Open observation units allow flexible admission and discharge. In open units, strict criteria or protocols governing which patients can be admitted or how long they can stay may be lacking. Admission and discharge decisions are often based on the healthcare provider's clinical judgment. Closed observation units often have more structured processes, ensuring that patients receive consistent care based on evidence-based guidelines. Healthcare providers in closed EDOUs adhere to established protocols, which can help streamline patient management and ensure a more standardized approach. Specialized units cater to specific conditions, such as cardiac or pediatric cases, and surgical observation units oversee postsurgical patients. Different providers from different specialties may manage each type of unit, resulting in differing management protocols and objectives. The findings of this study, which evaluated a closed EDOU, might not be generalizable to other settings due to the unique nature of each unit. Factors influencing return visits, such as patient demographics, severity of conditions, and unit-specific protocols, vary widely.

In this study, primary diagnoses leading to ED visits, such as anemia, were classified based on the most pressing condition that necessitated treatment, as documented in the medical records. The nature of the conditions treated in the EDOU at our institution is usually well-defined, with protocols often geared toward managing specific primary complaints. However, anemia and other conditions can coexist with other diseases. While our methodology focused on the primary reason for the ED visit, the potential for additional comorbidities is an acknowledged limitation. This reality emphasizes the necessity of interpreting our findings within the context of possible coexisting conditions, which may influence the likelihood of return ED visits. Recognizing this limitation highlights the importance of comprehensive assessments in the ED and EDOU and the intricate relationship between primary diagnoses and patient outcomes, suggesting further investigation into the effects of comorbid conditions on care needs and return rates.

It is also crucial to recognize the potential biases in the study's findings. Relying on electronic health records could introduce selection bias as patients with incomplete or missing electronic records were excluded from the analysis. Additionally, the study focused on patients who revisited the ED. Understanding the perspective of those who did not return could offer a more balanced view of the EDOU care experience. Exploring this was beyond the scope of a retrospective study.

The authors acknowledge the complexity introduced by patients who visited the ED multiple times within 30 days following their initial EDOU assessment. While this subset may have introduced bias to the data, disproportionately highlighting certain trends or associations and excluding these individuals from the analysis warrants caution. Although separating repeat returners could seemingly refine the dataset, providing clearer insights into the primary drivers of single-visit ED returns, such an approach may ignore the intricate realities of ED recidivism. Repeat returners offer crucial insights into systemic healthcare challenges and chronic care management, indicating areas requiring improvement. Their inclusion ensures that our analysis mirrors the real-world intricacies of ED utilization. By including the full spectrum of patient visits, we aimed to capture a comprehensive

overview of the patient population, ensuring that our findings and subsequent recommendations address the realities faced by all segments of patients.

Finally, the study period was limited to the 30 days following the initial EDOU visit. While this timeframe provided valuable insights into short-term return visit patterns, it did not capture potential long-term factors, chronic conditions, or interventions beyond this period that may influence patient outcomes and ED revisits.

Conclusions

The study identified factors related to patients' returns to the ED within 30 days after an EDOU visit. Male patients, specific racial and ethnic groups, insurance status, certain diagnoses, and dispositions were associated with higher returns, while specific diagnostic tests lowered return rates. Understanding these factors may guide interventions, enhance EDOU care, and reduce resource strain. Further research should explore these associations and long-term intervention impacts for improved outcomes.

ARTICLE INFORMATION

Author contributions

Conceptualization: all authors; Data curation: all authors; Formal analysis: BH, DGS; Investigation: all authors; Methodology: BH, DGS; Project administration: BH; Resources: all authors; Software: JC, DGS; Supervision: BH; Validation: BH, DGS; Visualization: BH, DGS; Writing–original draft: BH, SS, PK, DGS; Writing–review & editing: all authors. All authors read and approved the final manuscript.

Conflicts of interest

The authors have no conflicts of interest to declare.

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Data availability

Data analyzed in this study are available from the corresponding author upon reasonable request.

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